Preignition Conversion of Methane   77653
Hydrocarbons in Internal Combustion   SOV/80-33-2-28/52
Engines

                compressed without ignition,and expelled into a large,
                water- or dry ice-cooled flask. The tests were made
                at 1,000 rpm, 110° temperature of the gaseous mixture,
                and only a 4.33 compression ratio to avoid the self-
                detonation of the mixture. The analysis of the com-
                pression products showed that the chief process
                occurring in from 150 to 300° C and 250 to 400° C was
                the thermal decomposition of the molecules and the
                formation of unsaturated hydrocarbons. Branched
                hydrocarbons showed higher stability of the molecular
                structure than the normal hydrocarbons. The rate of
                molecule decomposition was in direct ratio to the amount
                of the hydroperoxides formed and the total oxidizability
                of the hydrocarbons. The insignificant amount of the
                hydrocarbon conversion (about 1%) during the 0.015 sec
                time of the compression cycle determines, nevertheless,
                the direction and character of the fuel combustion in the
Card 2/3   in the engine. There are 2 tables; and 8 references,

Preignition Conversion of Methane   77653
Hydrocarbons in Internal Combustion   SOV/80-33-2-28/52
Engines

> 2 U.S., 1 U.K., 5 Soviet. The U.S. and U.K. refer-
> ences are: A. Fallah, R. Long, F. Garner, Fuel, 1, 4
> (1952); A. Pahnke, P. Cohen, B. Sturgis, Ind. Eng. Chem.,
> 46, 5, 1024 (1954); G. Lappin, Anal. Chem., 23, 541
> (1951).

ASSOCIATION: A. A. Zhdanov Leningrad State University (Leningradskiy
                gosudarstvennyy universitet imeni A. A. Zhdanova)

SUBMITTED: July 8, 1959

Card 3/3

S/152/61/000/008/001/001
B126/B101

AUTHORS: Gavrilov, B. G., Danilova, L. P.

TITLE: The problem of the composition of aromatic hydrocarbons
               separated from the kerosene fraction by sulfonation

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Neft' i gaz, no. 8,
               1961, 93 - 98

TEXT: The authors studied the conversion of alkyl aromatic hydrocarbon
blends obtained from sulfoaromatic compounds and their reaction with
alumosilicates at low temperatures. The kerosene fraction 200 - 270°C
was taken as feedstock and treated with sulfuric acid. The acid tar
obtained was passed through superheated steam at 160 - 170°C. After
treatment with caustic soda and subsequently with strong sulfuric acid
and potassium permanganate, the purified, dried product was distilled
with metallic sodium; thus, aromatic hydrocarbons were obtained with the
following analytical data: boiling range 158 - 250°C, n_D^{20} 1.4992,
d_4^{20} 0.8903, molecular weight 145,2. Three different tests were carried out

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S/152/61/000/008/001/001
B126/B101

The problem of the....

with these hydrocarbons: 1) rectification in a column with 30 theoretical plates, 2) heating in an autoclave with a synthetic alumosilicate catalyst 1;1 up to 300°C for 10 hr, subsequent drying and rectification, 3) the same test in which the synthetic alumosilicate was, however, replaced by gumbrin (Cenomanian bleaching clay from Georgia). The first test yielded 15 benzene homologs. The second and third tests yielded a much wider range of derivatives, i. e., benzene homologs, cyclopentanes, toluene, and xylenes (ortho, para, and meta). With the use of the synthetic alumosilicate catalyst, about 22% aromatic hydrocarbons with a lower molecular weight were formed, and with natural clay, about 18%. This shows that the former was more efficient. Moreover, these tests showed that the hydrocarbon blend obtained after treatment of sulfuric acids with steam contained no naphthalene derivatives. Accordingly, sulfocompounds are stabler than similar compounds of the benzene range. The method described is recommended for application in laboratory tests for separation of aromatic hydrocarbons. There are 3 tables and 10 references: 8 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: Hansford R., Meyer C., Sachanen A. Ind. Eng. Chem. 37, 371, 1945; Brouton, D. Pat. USA No. 279 4839 4, 6, 1957.

Card 2/3

The problem of the...

S/152/61/000/008/001/001
B126/B101

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova
(Leningrad State University imeni A. A. Zhdanov)

SUBMITTED: May 15, 1961

Card 3/3

GAVRILOV, B.G.; ZAVERTKIN, V.A.

Effect of lead and manganese naphthenate additions on the explosive
properties of certain hydrocarbons. Zhur.prikl.khim. 34 no.3:589-
592 Mr '61.   (MIRA 14:5)
   (Naphthenic acid) (Motor fuels—Antiknock and antiknock mixtures)

S/080/62/035/004/017/022
D244/D301

II. 0140

AUTHORS: Bychkova, M. K., Gavrilov, B. G., Gulin, Ye. I. and
               Lesnikov, A. P.

TITLE: Pre-flame conversion of hydrocarbons in diesel engines
               at the critical stages of compression

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 4, 1962, 892-896

TEXT: The authors investigated pre-flame reactions in compression
ignition engines. The following fuels were used: ГВ (GV)-vacuum gas
oil, ЛКГ (LKG)-light catalytic gas oil, ДС (DS)-special diesel fuel,
ТС-1 (TS-1) fuel for reaction engines, ДЛ (DL)-summer diesel fuel,
ИМН (IMN)-isomethane-naphthene hydrocarbons, n-cetane, α-methyl
naphthalene, undecane and dodecane. The experiments were conducted
in a standard engine ИТ9-3 (IT9-3). Samples of condensed gases from
the combustion chamber were extracted into a Bunsen flask attached
to a side tube fixed to the exhaust pipe. The condensate was ana-
lyzed for unsaturated and oxygen-containing compounds of all types.
In all experiments the main pre-flame conversion process was the

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Pre-flame conversion of ...

destruction of hydrocarbon molecules under the influence of heat of compression, accompanied by the formation of unsaturated hydrocarbons. The final conversion depended on the hydrocarbon composition of the fuels and in particular on their content of normal hydrocarbons. Isomethane-naphthene hydrocarbons were converted to a much smaller extent than the normal hydrocarbons. The latter gave a large quantity of unsaturated compounds and oxidation products at relatively small degrees of compression and low temperatures. Exceptional stability was shown by α-methyl naphthalene. For the normal hydrocarbons the stability decreased with their molecular weight. For all fuels the conversion reactions took place in the gaseous phase. In the pre-flame period the degree of fuel conversion was directly proportional to its vapor pressure in the combustion chamber. There are 1 table and 13 references: 8 Soviet-bloc and 5 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: E. Retaillian, M. Richerds and C. Jones, Am. Scient., 39, 656, (1951); M. Corzilius, D. Duggs and D. Pastell, S. A. E., 61 (1953); P. Garner, Fuel, 25, (1953); M. Eliot, .

Card 2/3

S/080/62/035/004/017/022
D244/D301

R. Davis and R. Friedel, III World Petroleum Congress, Section VII, (1951).

SUBMITTED: November 1, 1960

Card 3/3

X

GAVRILOV, B.G.; STEPINA, L.F.

Redistribution of methyl groups in the interaction of naphthalene with p-xylene and mesitylene on aluminosilicates. Neftekhimiia 3 no.4:511-514 Jl-Ag '63.
(MIRA 16:11)

1. Leningradskiy gosudarstvennyy universitet imeni Zhdanova.

GAVRILOV, B.G.; GULIN, Ye.I.; LESNIKOV, A.P.; NOVIKOVA, T.A.

Chemical principles of the thermoforcing of a diesel engine.
Zhur. prikl. khim. 36 no.11:2498-2502 N '63.

(MIRA 17:1)

GAVRILOV, B. I., and MUZHENKOVA, N. P.

"Publised Information and Experimental Data on the Virus Etiology of
Gastroenteritis," and "The Epidemiological Characteristics of an Unusual
Outbreak of Gastroenteritis," reports discussed at one of six meetings of the
Virological Section, Moscow Dept. All-Union Society of Microbiologists,
Epidemiologists, and Infectionists imeni I. I. Mechnikov in 1955. Voprosy
Virusologii, 1, No 2, 1956

Sum. 1003, 20 Jul 56

AFONIN, I. P.; GAVRILOV, B. I.; ZAVOYSKIY, Ye. K.; KARMANOV, F. V.;
MAKSIMOV, G. P.; PLAKHOV, A. G.; CHEREMNYKH, P. A.;
SHAPKIN, V. V.

The experimental plasma apparatus C-1 with screw magnetic
fields. Atom. energ. 14 no.2:143-150 F '63.
(MIRA 16:1)

(Plasma(Ionized gases))   (Magnetic fields)

BELNOV, P.I.; GAVRILOV, B.I.; ZAKATOV, I.P.; CHIRAMNYKH, V.V.

Heating of electrons in a TK-1 unit. Pis'. v red. Zhur. eksper.
i teoret. fiz. 2 no.8:398-402 O '65.   (MIRA 18:12)

1. Submitted September 7, 1965.

GAVRILOV, B. I.

GAVRILOV, B. I. - "Prolonged Tapping of the Pine Tree." Sub 12 May 52, Moscow Forestry Engineering Inst. (Dissertation for the Degree of Doctorates in Agricultural Sciences)

SO: Vechernaya Moskva January-December 1952.

GAVRILOV, B. I.

Pine

Effect of tapping on growth. Ies. khoz. 5, No. 7, 1952.

9. Monthly List of Russian Accessions, Library of Congress,   September 1952. Unclassified.

GAVRILCV, B. I.

Dlitel'naia podsochka sosny v SSSR /Continuous pine-tree tapping in the U.S.S.R./.
Moskva, Goslesbumizdat, /1954?/ 160 p.

SO: Monthly List of Russian Accessions, Vol. 7, No. 3, June 1954.

Gavrilov, B.I.

USSR / Forestry. Forest Economy.   K-4

Abs Jour: Biologiya, No. 1, 1958, 1348

Author : Gavrilov, B.I.

Inst   : Khar'kov Agricultural Institute

Title   : White Acacia Plantations and the Rules of their
          Structure

Orig Pub: Zap. Khar'kovsk. s.-kh. in-ta, 1955, 10 (47),
          15-32

Abstract: The results are given of an evaluatory survey
          of white acacia plantations on the Lower Dnepr
          Sands and in the Moldavian SSR. The rules of
          distribution of the trees are characterized by
          sectional areas; the correlations between rela-
          tive heights are explained as are the fluctua-
          tions of absolute and relative species numbers

Card 1/2

USSR   K-4

Abs Jour: Biologiya, No. 1, 1958, 1348

Author : Gavrilov, B.I.

          and of relative species heights; a dependence
          has been established between relative trunk
          sizes and their thicknesses. A close propor-
          tionality is noted between the distribution of
          the plantation trees according to degrees of
          thickness and the sum of the sectional areas.
          Q_2-type coefficients of the degrees of thick-
          ness change imperceptibly.

Card 2/2

USSR/Forestry

Abs Jour : Ref Zhur - Biol., No 15, 1958, 68016

begin to close). On the test plots the temperature regime was investigated for various heights. It was determined that intense thinning causes a rather significant increase in the temperature around the crowns, accelerating the process of photosynthesis. Soil moisture also increased significantly with increased thinning. The sharp change in the environmental conditions permitted intensification of the assimilation processes and increased inflow of moisture and salt solutions. As a result of 20 years of severe thinning, and clearing of all brushwood, the plantations grew rapidly in diameter, height, and volume, and preserved the normal trunk form and wood content. The formation of trunks was accelerated by 20 years both in volume and in quality, thus giving grounds to calculate on a 50% reduction in the time required for technical maturity. Over 27 years the total productivity of the rapid growth plantations was 63% of the productivity of the control areas; after 50 years'

Card 2/3

- 16 -

USSR/Forestry - Forest Economy.

K.

Abs J$_o$ur   :   Ref Zhur - Biol., No 15, 1958, 68016

growth the productivity of one of these plantations ex-
ceeded that of normal first quality plantations. The
technical properties of pine wood grown in free stand
conditions are close to the average, and no danger of
turf formation through thinning was noticed. A detailed
description is given of the method and technique of the
experiments and observations.   -- I.A. Bashkirov

Card 3/3

GAVRILOV, B.I.

Tapping of ripening pine trees. Gidroliz. i lesokhim.prom. 14
no.4:14-16 '61.   (MIRA 14:5)

1. Khar'kovskiy sel'skokhozyaystvennyy institut imeni V. V. Dokuchayeva.
                (Pine)   (Turpentining)

GAVRILOV, B.I.

Establishing the tapping technology according to geographic zones.
Gidroliz. i lesokhim.prom. 17 no.8:16-17 '64.

(MIRA 18:1)

L 25592-66   EWT(l)/ETC(f)/EPF(n)-2/EWG(m)   IJP(c)   AT

ACC NR: AT6001558   SOURCE CODE: UR/3136/65/000/907/0001/0035

AUTHOR: Blinov, P. I.; Gavrilov, B. I.; Cheremnykh, P.A.; Yashin, N. M.   65

ORG: none

TITLE: Effect of a helical field on the ohmic heating of plasma in the S-1 installation

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-907, 1965. Vliyaniye vintovogo polya na omicheskiy nagrev plazmy v ustanovke, S-1, 1-35

TOPIC TAGS: helical magnetic field, electron beam, plasma discharge, magnetic trap, plasma heating

ABSTRACT: Authors attempt to explain the role of an helical magnetic field in the development of a plasma discharge and retention of plasma in a trap, and the stabilization of the plasma filament. Based on the analysis of the first results of the experiments, a number of changes have been introduced into the S-1 installation. Additional conductors have improved the compensation of the lateral component of the magnetic field, so that the deflection of the electron beam after one turn along the axis of the chamber (L = 617 cm) did not exceed 1.5 mm. Thus the lateral component of a quasi-static magnetic field did not exceed 0.025%. Inside the chamber were installed two diaphragms with varying diameters from 5 to 8 cm, without disturbing the vacuum, in order to limit the discharge aperture. Additional resistance ranging from

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L 25592-66

ACC NR: AT6001558

0.05 ohm to 0.6 ohm was introduced into the ignitron circuit diagram for ohmic heat-
ing. The behavior of plasma during four basic modes of operation of the S-1 instal-
lation were compared. The discharge in all four modes of operation was studied at
various circuit voltages. The voltages changed according to the cosine law in the
form of rectangular impulses lasting 1 μ sec. at E = 0.1 v/sec and 100 μ sec at
E = 0.5 v/cm, after which the voltage dropped again to E = 0.1 v/sec and gradually
decreased. The authors conclude that the presence of an external helical field im-
proves the conditions for the development of a discharge, particularly at low
pressures. The electron temperature is somewhat higher. The external helical field
affected slightly the electron concentration, which in the case of this work could be
traced to deficiencies in the configuration of the magnetic field. Orig. art. has:
4 formulas, 20 figures, 3 tables.

SUB CODE: 20 / SUBM DATE: 00/ ORIG REF: 005/ OTH REF: 003

Card 2/2 fv

L 41033-66   EWT(1)   IJP(c)   AT

ACC NR: AP6013723   SOURCE CODE: UR/0089/66/020/004/0310/0315

AUTHOR: Blinov, P. I.; Gavrilov, B. I.; Cheremnykh, P. A.; Yashin, N. M.

ORG: none

TITLE: The influence of the helical magnetic field on ohmic plasma heating in the S-1 installation

SOURCE: Atomnaya energiya, v. 20, no. 4, 1966, 310-315

TOPIC TAGS: plasma conductivity, plasma confinement, plasma heating, helical magnetic field

ABSTRACT: Ohmic plasma heating experiments showed earlier that the temperature and confinement time of the plasma depend strongly on the transverse component $H_\perp$ of the magnetic field (L. A. Artsimovich, K. B. Kartashov, Dokl. AN SSSR, 146, 1305, 1962). In the present work, which was complete in 1963, the authors investigated experimentally the influence of a helical triple-thread magnetic field (with $H_\perp \simeq 0$) on the development of the discharge, and the magnitude of the conductivity and the position stabilization of the plasma beam. Results in the form of diagrams cover the voltage and current oscillograms, the pressure dependence of the development time and maximum current, and the time dependence of plasma

Card 1/2   UDC: 533.9

L 41033-66

ACC NR: AP6013723

conductivity, electron concentration, and current. Plasma radiation diagrams are also given. The electron temperature of 20—30 eV and ionic temperature of 10 eV correspond to a conduc-tivity of 10^{15} units (cgse system). The helical field improves the conditions for the development of the discharge and the heating of the plasma, while the confinement time of the plasma re-mains the same. Orig. art. has: 2 formulas and 6 figures.

SUB CODE: 20/ SUBM DATE: 11Sep65/ ORIG REF: 005/ OTH REF: 002

Card 2/2

GAVRILOV, B. I.

B. I. Gavrilov and V. E. Tishchenko, Interaction of sodium salts of thiolic acids with unsaturated a-di-bromides. II. The action of thiosulfate and ethyl-xanthogenate of so-dium. p. 1687

It is shown that together with the normal exchange reaction leading to the formation of sulfides and thio ethers there proceeds an abnormal reaction with formation of ethylene hydrocarbons. In all three cases studied, the yields of products of the normal reaction decreases with an increase of molecular weight and branching of the carbon chain of the di-bromides; the yield with the abnormal reaction increases under similar condition.

Lab. of Tech. Chem., Chem. Sci. Res. Inst. at the Leningrad State Univ.
April 19, 1947

SO: Journal of General Chemistry (USSR) 28, (80) No. 9 (1948)

GAVRILOV, B.

The yield of neutrons in the photodisintegration of uranium and thorium. L. Z. Lazareva, B. I. Gavrilov, B. N. Valuev, G. N. Zatsepina, and V. S. Stavinskii. *Sessiya Akad. Nauk S.S.S.R. po Mirnomu Ispol'zovaniya Atomnoi Energii, Zasedaniya Otdel. Fiz.-Mat. Nauk*, 1955, 306-20 (English summary, 320-1).—The photodisintegration of U^{238} and Th^{232} was investigated with photons from a 30-m.e.v. synchrotron. For bremsstrahlung photons with E_{max} from 6 to 28 m.e.v., the yield of photoneutrons and the av. ratio $\nu(E_{max})$ of neutron to fission yield were measured. For $E_{max} = 18.5$ m.e.v., the yields of delayed neutrons accompanying the photodisintegration of U^{238} and Th^{232} were measured also. The photoneutrons passed through a paraffin moderator and were registered in a BF_3 ionization chamber. The yield of fission fragments was measured by aid of a differential parallel-plate ionization chamber. The flux of bremsstrahlung photons, impinging on the sample, was detd. by measuring the ionization inside an Al chamber with 7.5 cm. thick walls. From the obtained curves, by aid of the photon difference method, one could now calc. the photoneutron cross section curves (σ_n) and the photofission cross-section curves (σ_f) for U^{238} and Th^{232}; the integrated cross sections for U^{238} were thus found to be 12.9 and 1.7, and for Th^{232} 6.6 and 0.64 m.e.v-barn, resp. Analysis of the σ_n and σ_f curves makes it possible to est. the probability for U^{238} and Th^{232} fission at various energies of the γ-ray excitation. This probability is fairly const. for U^{238} with 0.2-0.3, but for Th^{232} it is about 0.1 at 8-11 m.e.v., and increases to 0.3-0.4 at higher m.e.v. For an av. excitation energy of 12 m.e.v. the yield of delayed neutrons (as % of the total neutron yield) is 0.41 ± 0.02 for U^{238} and 0.18 ± 0.01 for Th^{232}.   Werner Jacobson

USSR/Nuclear Physics - Photofission   FD-2962

Card 1/1   Pub. 146 - 3/28

Author   :   Valuyev, B. N.; Gavrilov, B. I.; Zatsepina, G. N.; Lazareva, L. Ye.

Title   :   Average number of neutrons in one act of fission during the photo-
                decay of uranium and thorium

Periodical :   Zhur. eksp. i teor. fiz., 29, September 1955, 280-285

Abstract   :   The authors measured the average number of neutrons, nu, that
                are found in one act of fission during the photo-decay of ura-
                nium and thorium for mean energy of excitation of the nuclei
                around 12 Mev. For uranium the obtained value of nu is equal
                to 6.2 ± 0.5; for thorium, it is 14.2 ± 1.2. The measured quantities
                permitted the authors to evaluate the relative probability of
                fission during photo-decay of uranium and thorium nuclei. Seven
                references, all Western.

Institution :   Physical Institute im. P. N. Lebedev, Academy of Sciences USSR

Submitted   :   May 31, 1955

| SUBJECT | USSR / PHYSICS | CARD 1 / 2 | PA - 1318 |

| SUBJECT | USSR / PHYSICS | CARD 1 / 2 | PA - 1318 |

AUTHOR   GAVRILOV, B.I., LAZAREVA, L.E.
TITLE   The Yields of Photoneutrons of Medium and Heavy Nuclei.
PERIODICAL Zurn.eksp.i teor.fis, 30, fasc.5, 855-861 (1956)
Issued: 8 / 1956   reviewed: 9 / 1956

The yield of photoneutrons at various maximum energies of γ-bremsstrahlung from the threshold value of reaction (γ,n) - E_n up to E_{max} = 27 MeV for Cu,Zn,Cd,J, Ta,Au,Tl,Bi,Th,U was measured. These measurements were carried out with the synchrotron of the Physical Institute of the Academy of Science (for 30 MeV), which furnishes 150 γ-momenta of 20 μ sec duration each per second. The samples to be irradiated were fixed in the center of a paraffin block and the slowed down photoneutrons were registered at certain intervals of time between the γ-momenta by means of an ionization chamber filled with BF_3. The curves obtained for the photoneutron yield are illustrated by diagrams. From the integral curves of the neutron yield it is possible to compute the cross sections of the photoneutrons σ_n for different energies of the γ-quanta. The following characteristic values of the obtained cross section curves are shown in a table: cross section $\sigma_{n\ max}$ in the maximum, the energy $E_{\sigma n\ max}$ corresponding to the maximum cross section, the half width of the curve, and the total cross section. The total cross sections and the cross sections in the maximum increase in a similar manner with growing $Z(\sim Z^{1,6})$. In rough approximation the total cross section, which is expressed in

MeV barn, is connected up to 27 MeV with the maximum cross section (in barn) by

the relation $\int_{E_n}^{\Xi_0} \sigma_n dE \sim 8\sigma_{n\ max}$.

The absorption cross sections of γ-quanta: For nuclei with $Z \gg 0$ the measured photoneutron cross sections are $\sigma_n(E) \sim \sigma(\gamma,n) + 2\sigma(\gamma,2n) +$

$+ 3\sigma(\gamma,3n) + \dots \sim \sigma_\gamma(E)\bar{n}(E)$. Here $\bar{n}(E)$ denotes the average number of neutrons emitted by the nucleus at the excitation energy E. After computation (by means of the statistical theory) of the relative probabilities (γ,n), $(\gamma,2n)$, ... and of $\bar{n}(E)$ at different excitation energies, the curves of the absorption cross sections $\sigma_\gamma(E)$ of the γ-quanta are obtained. The relative yields of the reaction which were experimentally measured for various isotopes agree well with theoretical values. The threshold values of the photoneutronic reactions which are possible at excitation energies of up to 27 MeV are shown in a table. At energies of more than 30 MeV the cross sections σ_γ have a noticeable size. If the absorption of γ-quanta is based on a dipole-like mechanism, a qualitative agreement of experimental and theoretical results is obtained. The qualitative comparison makes it necessary to measure neutron yields at higher energies This work is best carried out with monochromatization of measuring.

INSTITUTION: Physical Institute "P.N.LEBEDEV" of the Academy of Science in the
            USSR.

GAVAILOV, B.I.

4130

YIELDS OF PHOTONEUTRONS FROM INTERMEDIATE AND HEAVY NUCLEI. B. I. Gavrilov and L. E. Lazareva (Academy of Sciences, USSR). Soviet Phys. JETP 3, 671-7 (1957) Jan.

The yields of photoneutrons were measured for various maximum γ-bremsstrahlung energies lying between the threshold of the (γ,n) reactions up to $E_{max} = 27$ Mev. The photoneutron cross section was determined by the "photon difference method" as a function of the photon energy from the yield curves for ten elements (copper, zinc, cadmium, iodine, tantalum, gold, thallium, bismuth, thorium and uranium). (auth)

21(7)   SOV/89-6-3-5/29
AUTHORS: Groshev, L. V., Gavrilov, B. I., Demidov, A. M.

TITLE: Investigation of γ-Radiation Emitted by Nuclei at Capture
                  of Thermal Neutrons (Issledovaniye γ-luchey, ispuskayemykh
                  yadrami pri zakhvate teplovykh neytronov)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 3, pp 281 - 289 (USSR)

ABSTRACT: The Compton- (Kompton) spectrometer used in the measurement
                  of the γ-spectra has already been described in reference 2.
                  The spectrometer was located in such a way opposite to the
                  target and the neutron irradiation duct of the reactor VVR
                  of the AS USSR, as to expose only the target to the direct
                  neutron and γ-beam from the active zone of the reactor.
                  The γ-radiation originating from the target was collimated
                  over a length of 3650 mm by means of 7 lead diaphragms. The
                  predominating weakness of the spectrometer is its unusually
                  high γ-background, which is caused by its being placed very
                  near to the reactor. In order to suppress this background
                  the whole spectrometer was surrounded by a water tank and
                  paraffin bricks, respectively, and the measuring chamber
Card 1/3   of the spectrometer was protected by a lead shield about

Investigation of γ-Radiation Emitted by Nuclei at   SOV/89-6-3-5/29
Capture of Thermal Neutrons

10 cm thick. The intensity and the energy of the γ-radiation
originating from neutron capture was measured for the
following nuclei: P, Sc, Cr, Cu, Zn, Sn, and Sb. The values
obtained generally show a good agreement with values de-
termined earlier. The preparations of the individual element
were treated as follows: P_2O_5 was put into a bakelite box,
which could be sealed hermetically. The preparation was
besides inserted into an aluminum casing with a wall thick-
ness of 1 mm. The target had a diameter of 140 mm, a length
of 120 mm and a weight of 1.5 kg. Caused by the presence of
the intensive capture γ-lines originating from the hydrogen,
lead and aluminum in the preparation it was impossible to
record the γ-spectrum of P^{32} in the range of 3.22 and >7 MeV.
Sc_2O_3. The target had a diameter of 100 mm and a weight of
25 g. The preparation was housed in a graphite container.
No measurements could be conducted in the range of 2.23
and $\sim$ 7.38 MeV due to the intensive background caused by the
reaction $H(n,\gamma)D$, $Pb^{207}(n,\gamma)Pb^{208}$.

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Investigation of γ-Radiation Emitted by Nuclei at   SOV/89-6-3-5/29
Capture of Thermal Neutrons

Cr_2O_3: The target had a diameter of 120 mm, a length of
10 mm and a weight of 1 kg. The γ-spectrum of the chromium
isotopes 53 and 54 could not accurately be recorded in the
range of 7.38 MeV.
Cu and Zn: The targets consisted of a ring with a diameter
of 110 mm and a thickness of 20 mm. They weighed 1.7 and
~ 1.3 kg, respectively. The target was exposed to the inci-
dent neutron beam at an angle of 45°. The background was in
the range of 7.38 MeV very weak. For this reason this region
could be measured for these two elements. A. S. Volkov pre-
pared and performed the stabilization and the measurement of
the magnetic field. There are 7 figures, 4 tables, and 13
references, 5 of which are Soviet.

SUBMITTED: November 17, 1958

Card 3/3

L 45596-65   EPA(w)-2/EWT(m)/EWA(m)-2   Pab-10   DM

ACCESSION NR: AP5009121

S/0089/65/018/003/0273/0275

AUTHOR: Gavrilov, B. I.; Karmanov, F. V.; Maksimov, G. P.

TITLE: On the operation of a cylinderizer in a stellarator

SOURCE: Atomnaya energiya, v. 18, no. 3, 1965, 273-275

TOPIC TAGS: stellarator, magnetic field configuration, cylinderizer, magnetic trap

ABSTRACT: The authors present preliminary results of the experimental verification of one variant of a "cylinderizer" which transforms triangular magnetic surfaces in a stellarator into cylindrical surfaces. Approximate calculations for such devices were presented by E. Friman et al (The Proposed Model C Stellarator Facility, Project Matterhorn, Ch. IV, NYO-7899, p. 78). The cylinderization of helical magnetic surfaces, produced by a trifilar helical winding, was investigated by sweeping electron beams from a source of 19 beams placed in an axially-symmetrical magnetic field. The electron beams were made to follow circular paths and were displayed on a fluorescent screen after passing along the magnetic force lines through the region of the investigated helical magnetic field. The chamber and the system of coils to produce the magnetic field are described briefly. The cyl-

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L 45596-65

ACCESSION NR: AP5009121

inderizer described was found to exert too strong an influence on the magnetic surface, and cylinderization of the magnetic surfaces to acquire triangular form again. It was necessary to either reduce the current by 10% or reduce the length of the cylinderizer by 10%. Relations between the cylinderizer dimensions, the current, and the pitch of the trifilar helical winding are presented. Orig. article has: 3 figures and 2 formulas.

ASSOCIATION: None

SUBMITTED: 14May64   ENCL: 00   SUB CODE: ME

NR REF SOV: 001   OTHER: 001

Card 2/2

L 11885-66   EWT(l)/ETC(F)/EPF(n)-2/EWG(m)   IJP(c)   AT

ACC NR: AP5028024   SOURCE CODE: UR/0386/65/002/008/0398/0402

AUTHOR: Blinov, P. I.; Gavrilov, B. I.; Zakatov, L. P.; Cheremnykh, P. A.

ORG: none

TITLE: Electron heating in the TN-1 installation

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 8, 1965, 398-402

TOPIC TAGS: plasma heating, plasma injection, plasma electron temperature, plasma acceleration, microwave plasma/ TN-1

ABSTRACT: The authors discuss results obtained with the TN-1 installation (Fig. 1), which was constructed to heat the electronic component of a plasma by means of a high-frequency shock circuit. The quasistatic field H_0 reached a maximum within 5 μsec, after which it decreased with a 20 msec time constant. The mirror ratio was 2, the maximum value of the field H_0 in the center of the trap was 8 koe. The plasma was injected in the trap by a coaxial injector with electrodes made of deuterium-impregnated titanium. By varying the injector voltage it is possible to vary the plasma density from $n_e > 2 \times 10^{13}$ cm^{-3} to $n_e < 10^{11}$ cm^{-3}. A single-turn loop with frequency $\nu = 3.5$ Mc at a voltage $u_c = 120$ kv on a capacitor $C_c = 3 \times 10^{-8}$ F produced a field of $H = 900$ oe. By varying the time interval between the operation of the high-frequency loop and the application of the magnetic field, it was possible to study the heating of the electrons at different H/H_0. It was expected that the electrons with $n_e = 2 \times 10^{12}$ cm^{-3} would be heated to $T_e = 3$ kev, and that further adiabatic compression

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ACC NR: AP5028024

would raise the temperature to ~30 kev. The
experiment has shown that the cold plasma
filling the trap chamber decayed as a result
of recombination with a time constant τ_c
= 300 μsec. Not more than 10% of the high-
frequency field energy goes into plasma
heating, and the authors' data have so far
not confirmed the conclusion that turbulent
heating of a plasma by means of a shock
circuit is highly effective. The x-rays
of energy ~20 kev emitted from the chamber
after the closing of the circuit are due to
the presence of an accelerating mechanism
and do not prove the existence of high elec-
tron temperatures. Authors thank Ye. K. Za-
voyskiy for suggesting the topic and interest in the work, and L. I. Rudakov, G. V.
Sholin, A. V. Gordeyev, and L. V. Korablev for useful discussions. Orig. art. has:
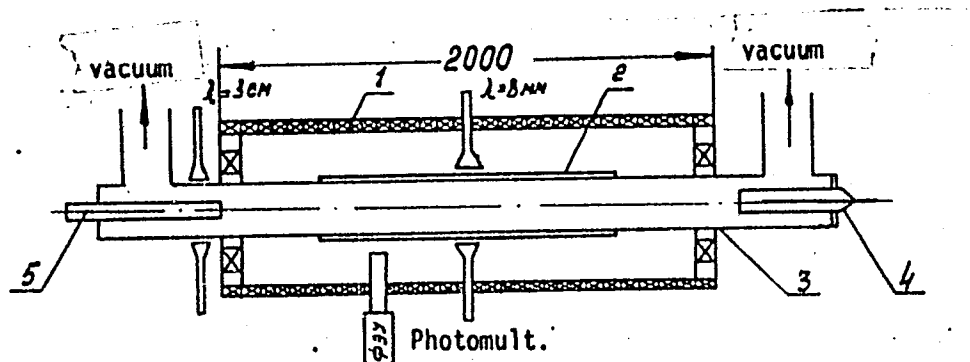3 figures.
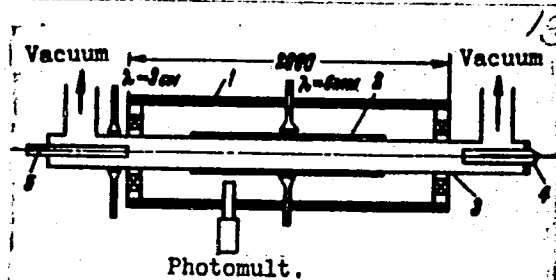
Photomult.

Fig. 1. Diagram of TN-1 installation.
1 - Solenoid, 2 - high-frequency shock
circuit, 3 - vacuum glass chamber, 4 -
plasma injector, 5 - grid probe or x-
ray detector.

SUB CODE: 20/   SUBM DATE: 07Sep65/   ORIG REF: 007

Card 2/2

L 20386-66   E T(1)/ETC(f)/EPF(n)-2/E G(m)   IJP(c)   AT
ACC NR: AT6001561   SOURCE CODE: UR/3136/65/000/912/0001/0008

AUTHOR: Blinov, P. I.; Gavrilov, B. I.; Zakatov, L. P.; Cheremnykh, P. A.

ORG: Institute of Atomic Energy im. I. V. Kurchatov (Institut atomnoy energii)

TITLE: Heating of electrons in the TN-1 installation

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-912, 1965. Nagrev
elektronov v ustanovke TN-1, 1-8

TOPIC TAGS: plasma heating, electron temperature, plasma injection, magnetohydro-
dynamics, plasma wave propagation, plasma discharge, x ray emission/ TN 1

ABSTRACT: The authors describe apparatus TN-1 (Fig. 1), designed for heating the
electronic component of a plasma by means of a high frequency shock circuit. The
quasistatic field reached a maximum within 5.0 msec, after which it dropped off
with a time constant of 20 msec. The mirror ratio was 2, and the maximum field in
the center of the trap was 8 koe. A single-turn loop with frequency 3.5 Mcs with
a discharge of 3×10^{-8} F capacitor at a voltage of 120 kv, produced a field of
900 oe. The plasma was injected in traps by means of a coaxial injector. The
plasma density could be varied from 2×10^{13} to 10^{11} cm^{-3} by varying the injector
voltage. The heating was investigated in the electron density region 10^{12}--10^{13}
cm^{-3}. The tests have shown that a radial magnetohydrodynamic wave propagated in

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ACC NR: AT6001561

Fig. 1. Diagram of TN-1 installation. 1 - Solenoid, 2 - high
frequency shock circuit, 3 - vacuum glass chamber, 4 - plasma in-
jector, 5 - grid probe or end-window x-ray detector.

the plasma, and that the wave front becomes steeper upon heating. The electron
distribution function relative to the longitudinal energy disclose the presence of
two groups of electrons, a main group with average energy 100--250 ev, and a

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ACC NR: AT6001561   5

secondary group (25%) with energy of the order of 1 kev. Discharge of the plasma
filled with the aid of the injector gave rise to emission of x-rays of energy 20
kev from the chamber, the x-radiation lasting as much as 25 msec. These x-rays
are shown to be the result of the acceleration mechanism in the plasma. The
authors thank Ye. K. Zavoyskiy for suggesting the topic and interest in the work,
and L. I. Rudakov, L. V. Korablev, G. V. Sholin, and A. V. Gordeyev for useful
discussions. Orig. art. has: 3 figures.

SUB CODE: 20/   SUBM DATE: none/   ORIG REF: 006/ OTH REF: 001

Card 3/3

GAVRILOV, B. K.

"Application of Mechanical Rectifiers in Synchronous Motors of Normal Design."
Cand Tech Sci, Ural Polytechnic Inst imeni S. M. Kirov, Min Higher Education USSR,
Sverdlovsk, 1954. (KL, No 1, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational
Institutions (12)

SO: SUM No. 556, 24 Jun 55

AUTHORS: Siunov, N. S., Professor, Doctor of   SOV/105-58-8-9/21
           Technical Sciences, Gavrilov, B. K., Candidate of Technical
           Sciences, Breyev, V. N., Candidate of Technical Sciences

TITLE: Excitation of a Synchronous Motor of Normal Construction With
           the Application of Mechanical Rectifiers (Vozbuzhdeniye
           sinkhronnykh dvigateley normal'noy konstruktsii s primeneniyem
           mekhanicheskikh vypryamiteley)

ABSTRACT: The problem of the spark-free commutation of mechanical
            rectifiers was solved best by S. G. Tamantsev (Ref 1). In
            the scheme proposed by him the mechanical rectifier is fed by
            a supplementary winding fitted in the slots of the stator of
            the generator. The experiments by S. G. Artanov (Ref 2) showed,
            that this scheme guarantees a spark-free commutation in con-
            tinuous operation only at a constant load. A circuit is
            described which guarantees a satisfactory commutation also at
            shock load. For this purpose a transformer with three windings
            is employed, which feeds the circuit of the exciter winding
            of the synchronous motor across a mechanical rectifier. The
            synchronous motor has a normal design and needs no additional

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Excitation of a Synchronous Motor of Normal Construction SOV/105-58-8-9/21
With the Application of Mechanical Rectifiers

winding in the stator. The circuit diagram is described. Sub-
sequently the operation of the transformer in a circuit with
the three-winding adjustable transformer is investigated. It
is shown, that a sufficient resistance of the brush contact,
a small equivalent inductivity of the transformer equipment
and an accurately determined position of the brush holder
must be guaranteed in order to ensure a satisfactory per-
forrance of the mechanical rectifier. In connection with the
experimental investigation of the synchronous motor with a
mechanical rectifier its performance was examined at a con-
tinuous and at a sudden change of load. The numerous results
showed a satisfactory commutation of current in the whole
range of motor load. The motor operates stably and with a
practically spark-free commutation at a sudden change of load
from zero to 7o% of nominal load. As a summary it is stated:
The excitation of syncnronous motors of normal design of small
and medium power can be performed by means of a mechanical
rectifier. The rectifier is connected to the output side of a
three-phase transformer with three windings and a controllable
Card 2/3   magnetic shunt. 2) The circuit described guarantees an auto-

Excitation of a Synchronous Motor of Normal Construction   SOV/105-58-8-9/21
With the Application of Mechanical Rectifiers

matic increase of exciter current with an increase of load in
the motor. 3) The commutation of the mechanical rectifier is
satisfactory at a slow as well as at a sudden change of load.
There are 7 figures and 3 references, all of which are Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. Kirova (Ural
Polytechnical Institute imeni Kirov)

SUBMITTED: March 4, 1958

1. Electric motors--Design   2. Motor generators--Application
3. Electric circuits--Test results   4. Transformers--Performance

Card 3/3

BREYEV, V.N., kand. tekhn. nauk; GAVRILOV, B.K., kand. tekhn. nauk

Mechanical rectifier in the excitation circuit of synchronous machinery. Trudy Ural. politekh. inst. no.90:5-20 '58.
(MIRA 13:2)

(Electric generators--Design and construction)
(Electric current rectifiers)

GAVRILOV, B.K., kand. tekhn. nauk

Static characteristics of synchronous motors with a regulating transformer and mechanical rectifier in the excitation circuit. Trudy Ural. politekh. inst. no.90:21-27 '58.   (MIRA 13:2)
(Electric motors, Synchronous)

88170

S/144/60/000/010/007/010
E194/E355

9.3250 $(1020, 1143, 1154)$

AUTHORS: Siunov, N.S., Doctor of Technical Sciences, Professor,
Departmental Head, Gavrilov, B.K., Candidate of
Technical Sciences, Senior Lecturer and
Kovylov, B.V., Assistant

TITLE: The Influence of Capacitance on the Operation of a
Mechanical Rectifier

TEXT: Current commutation by a mechanical rectifier in the
field circuit of a synchronous motor may be improved by
shunting the rectifier brushes by ohmic resistance. However,
such resistances lower the efficiency of the rectifier.
Better and more efficient commutation may be obtained by using
additional capacitances instead of the shunt resistances. In
view of the previous article by some of the present authors,
published in this journal, 1959, No. 6, the operation of
mechanical rectifiers is now considered and the conditions
necessary to obtain sparkless commutation are established.

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The Influence of Capacitance on the Operation of a Mechanical
Rectifier

Fig. 1 shows a circuit of a single-phase mechanical two-plate
rectifier with supply transformer. The differential equation
for the concluding stage of commutation is given and analysis
of its solution makes it possible to establish a physical
picture of the processes during current commutation. Near the
point where the voltage of the supply to the rectifier passes
through zero there is a certain current when the transformer
and load circuit are interrupted. As both transformer and
load have appreciable inductance, a charging current passes
into the capacitor. Later the capacitance discharges,
partially through the transformer winding and partially through
the load. The process of discharge may be periodic or aperiodic.
Since the natural capacitance of the transformer is small,
considerable over-voltages are set up in the process of current
switching, their peak values reach 200 - 230 V. These over-
voltages can cause severe sparking at the brushes. As the

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The Influence of Capacitance on the Operation of a Mechanical Rectifier

capacitance is increased the over-voltage is reduced, and the duration of the concluding stage of commutation extends because the frequency of voltage restoration falls. Restoration of the voltage follows a sinusoidal law. The amplitude is exponentially damped and is superimposed on the sinusoidal supply voltage. As the capacitance is increased to a value of $4 L/r^2$, the periodic law of voltage restoration becomes aperiodic, so improving the electromagnetic conditions of current commutation. The rectifier ceases to spark over a wide range of change of load. All this is illustrated by the oscillograms of Fig. 2.

Operation of a three-phase mechanical rectifier is then considered. The principles of this machine have been described elsewhere and are not enumerated, here. The influence of capacitance on the current commutation of a three-phase mechanical rectifier was studied with the circuit

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The Influence of Capacitance on the Operation of a Mechanical
Rectifier

shown schematically in Fig. 3. The tests were made with
purely resistive and also with mixed inductive loads. This
second type of load is the most difficult to provide for and
so the results given below relate to it. Fig. 4 shows
oscillograms of rectified voltage and current (a) with a
capacitance of 1 036 μF and (b) with a resistance of 3.3 ohm
and no capacitance.
It will be seen that the over-voltage peaks typical of
mechanical rectifiers without shunt resistances are absent
from both these curves. When shunt resistance is used there
is an appreciable fall in the efficiency of the rectifier,
whereas with shunt capacitance the efficiency is 97%.
Fig. 5 shows oscillograms of rectified current and voltage
(a) with shunt capacitance and (b) with shunt resistance.
The rectification coefficient is 10   15% higher with
capacitance than with resistance. The article concludes with

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S/144/60/000/010/007/010
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The Influence of Capacitance on the Operation of a Mechanical Rectifier

instructions for adjusting the rectifier to secure optimum operating conditions.   There are 5 figures and 4 Soviet references.

ASSOCIATION: Kafedra elektricheskikh mashin Ural'skogo politekhnicheskogo instituta   (Department of Electrical Machines, Ural Polytechnical Institute)

SUBMITTED: January 20, 1960

Card 5/5

GAVRILOV, B.K., inzh.

Accuracy of determining the volume of overburden by transit.
survey data. Isv. vys. ucheb. zav.; gor. zhur. no. 11:101-110
'60.
(MIRA 13:12)

1. Sverdlovskiy gornyy institut imeni V.V. Vakhrusheva.
Rekomendovana kafedroy marksheyderskogo dela Sverdlovskogo
gornogo instituta.
(Mine surveying)

SIUNOV, Nikolay Sergeyevich, doktor tekhn.nauk, prof.; GAVRILOV, Boris
Konstantinovich, kand.tekhn.nauk, starshiy prepodavatel' KOVYLOV,
Boris Vladimirovich, assistent

Effect of capacitance on the performance of a mechanical rectifier.
Izv. vys. ucheb. zav.; elektromekh. 3 no.10:93-97 '60.
(MIRA 14:4)

1. Zaveduyushchiy kafedroy elektricheskikh mashin Ural'skogo
politekhnicheskogo instituta (for Siunov). 2. Ural'skiy politekhni-
cheskiy institut (for Gavrilov). 3. Kafedra elektricheskikh mashin
Ural'skogo politekhnicheskogo instituta (for Kovylov).
(Rotary converters)

S/196/61/000/009/030/052
E194/E155

AUTHORS: Siunov, N.S., Gavrilov, B.K., and Kovylov, B.V.

TITLE: A synchronous motor with mechanical rectifier shunted by capacitance

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, no.9, 1961, 23, abstract 9I 155. (Vestn. elektroprom- sti, no.2, 1961, 45-48)

TEXT: The commutation of the mechanical rectifier of a machine field system was investigated. The supply was from a three-winding transformer controlled by a magnetic shunt. The alternating current side of the mechanical rectifier was shunted by capacitors connected in delta. The single-phase current rectification conditions are considered. The physical processes that take place in mechanical rectifiers are explained and the value of capacitance required to ensure sparkless commutation is selected. It is established that the transformer circuit of the mechanical rectifier should contain the following ohmic resistance:

$$r_k = 2\sqrt{L/C}$$

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A synchronous motor with ...

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E194/E155

It would not be rational to increase the transformer resistance, because of the consequent lower efficiency, and so the necessary conditions can be achieved by connecting shunt capacitance C across the rectifier input. The additional capacitance reduces the amplitude, frequency and rate of voltage restoration, thus extending the sparkless zone to angular differences of up to 30 electrical degrees. Shunting resistors selected to give maximum efficiency give sparkless commutation in the zone up to 10 electrical degrees when the rectifier operates with a transformer without compounding winding. The greatest width of the sparkless zone achieved by the use of input capacitance across the rectifier, and the possibility of maintaining the angular difference at the lowest levels, together ensure sparkless operation of the rectifier over all ranges of motor load under static and dynamic conditions. A motor with the suggested field circuit has greater static and dynamic stability than motors with machine excitation, and the efficiency of a mechanical rectifier, allowing for the additional capacitors, is 96-97%.   5 illustrations.

[Abstractor's note: Complete translation.]
Card 2/2

ANTIPOV, M.F.; GAVRILOV, B.K.; MILAYKIN, I.F.; PAVLININ, V.M.; REZIN, M.G.

"DC machinery design" by IA.S. Gurin and M.N. Kurochkin.
Reviewed by M.F. Antipov and others. Elektrichestvo no.3:95-96
Mr '62.   (MIRA 15:2)
          (Electricity machinery—Direct current)
          (Gurin, IA.S.)   (Kurochkin, M.N.)

KOVYLOV, B.V.; GAVRILOV, B.K.; PLASTUN, A.T.

Single-phase mechanical rectifier with capacitance in the
excitation circuit of the synchronous motor. Trudy Ural.
politekh. inst. no.124:16-24 '62.   (MIRA 16:8)

CHUGAY, A.D.; LADIYEV, R. Ya.; GAVRILOV, B.M.; LOBURENKO, A.I.; SHUGUROV, V.S.

Processes for the manufacture of rubber adhesives and their automatic
control. Kauch. i rez. 20 no.6:41-45 Je '61.   (MIRA 14:6)

1. Kiyevskiy zavod "Krasnyy rezinshchik" i Institut avtomatiki
Gosplana USSR.
                        (Rubber)
                        (Adhesives)
                        (Automatic control)

GAVRILOV, B. M.[Havrylov, B. M.]

Some types of quality control instruments manufactured by firms
in France. Khim. prom.[Ukr.] no.1:91-94 Ja-Mr '62.
                                              (MIRA 15:10)

1. Institut avtomatiki Gosplana UkrSSR.

        (Chemical industries—Quality control)
        (France—Scientific apparatus and instruments)

LADIYEV, R.Ya.; GAVRILOV, B.M.; SHUGUROV, V.S.; LOBURENKO, A.I.

Automation of the operations of the benzene retrieving system.
Kauch.i rez. 21 no.8:45-47 Ag '62.   (MIRA 16:5)

1. Institut avtomatiki Gosplana UkrSSR.
                     (Rubber industry—Equipment and supplies)
                               (Automatic control)
                                     (Benzene)

Q-8

USSR/Farm Animals - Honey Bees.

Abs Jour : Ref Zhur - Biol., No 1, 1958, 2679

Author   : B.N. Gavrilov
Inst   : —
Title   : The Use of Acetic Acid Against the Nosema Disease of Bees.

Orig Pub : Pchelovodstvo, 1957, No 4, 47-50

Abstract : Laboratory experiments' at the Leningrad Veterinary Institu-
te demonstrated that nosema spores found in the fecal dis-
charge of bees when exposed to the vapors of glacial ace-
tic acid at a temperature of 18-20° died after 7 days.
The same effect was obtained in the course of one hour
when the spores were exposed to the vapors of a 30 percent
solution and a temperature of 53-54°. After disinfection
the bee hives were aired, and were readily accepted by bees.

Card 1/1

Q-5

USSR / Farm Animals. Honeybee.

Abs Jour: Ref Zhur-Biol., No 23, 1958, 105738.

Author : Gavrilov, B. N.
Inst   : Leningrad Veterinary Institute.
Title   : On the Treatment of Nosematosis of Honeybees.

Orig Pub: Sb. rabot Leningr. Vet. in-t, 1957, vyp.20,
          181-190.

Abstract: Experiments in the treatment of honeybees, in
cages placed in a thermostat at a temperature of
32-33°, with penicillin (500,000 international
units per 1 liter of sugar syrup) and with bio-
mycin (250 and 500 mg. per 1 liter of feed) were
ineffective. Likewise, no positive results were
obtained in the industrial experiments carried
out on small colonies. Satisfactory results were
obtained with the use of fumidil B (250 mg./.).

Card 1/2

GAVRILOV, B. N.: Master Biol Sci (diss) -- "Therapeutic and prophylactic meas-

sures in nosematoses of bees". Leningrad, 1959. 22 pp (Min Agric USSR, Leningrad

Vet Inst), 150 copies (KL, No 17, 1959, 107)

NIKIFOROVA, V.D.; GAVRILOV, B.P.

Permian and Triassic sediments in the western Verkhoyansk Range.
Trudy VNIGRI no. 130:125-157 '59.   (MIRA 14:4)
          (Verkhoyansk Range—Geology, Stratigraphic)

GAVRILOV, B. YE.,

95

S/089/62/013/006/019/027
B102/B186

AUTHORS: G. T. and M. R.

TITLE: Nauchnaya konferentsiya Moskovskogo inzhenerno-fizicheskogo
            instituta (Scientific Conference of the Moscow Engineering
            Physics Institute) 1962

PERIODICAL: Atomnaya energiya, v. 13, no. 6, 1962, 603 - 606

TEXT: The annual conference took place in May 1962 with more than 400
delegates participating. A review is given of those lectures that are
assumed to be of interest for the readers of Atomnaya energiya. They are
following: A. I. Leypunskiy, future of fast reactors; A. A. Vasil'yev,
design of accelerators for superhigh energies; I. Ya. Pomeranchuk,
analyticity, unitarity, and asymptotic behavior of strong interactions at
high energies; A. B. Migdal, phenomenological theory for the many-body
problem; Yu. D. Piveyskiy, deceleration of medium-energy antiprotons in
matter; Yu. M. Kogan, Ya. A. Iosilevskiy, theory of the Mössbauer effect;
M. I. Ryazanov, theory of ionization losses in nonhomogeneous medium;
Yu. B. Ivanov, A. A. Rukhadze, h-f conductivity of subcritical plasma;

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S/089/62/013/006/019/027
B102/B186

Nauchnaya konferentsiya...

Ye. Ye. Lovetskiy, A. A. Rukhadze, electromagnetic waves in nonhomogeneous plasma; Yu. D. Kotov, I. L. Rozental', the origin of fast cosmic muons; Yu. M. Ivanov, muon depolarization in solids; V. G. Varlamov, Yu. M. Grashin, B. A. Dolgoshein, V. G. Kirillov-Ugryumov, V. S. Roganov, A. V. Samoylov, μ⁻ capture by various nuclei; V. S. Demidov, V. G. Kirillov-Ugryumov, A. K. Ponosov, V. P. Protasov, F. M. Sergeyev, scattering of π⁻ mesons at 5 - 15 Mev in a propane bubble chamber; S. Ya. Nikitin, M. S. Aynutdinov, Ya. M. Selektor, S. M. Zombkovskiy, A. F. Grashin, muon production in π⁻p interactions; B. A. Dolgoshein, spark chambers; N. G. Volkov, V. K. Lyapidevskiy, I. M. Obodovskiy, study of operation of a convection chamber; K. G. Finogenov, production of square voltage pulses of high amplitudes; G. N. Aleksakov, problems of color vision; V. K. Lyapidevskiy, relation between number of receivers and number of independent colors; Ye. M. Kudryavtsev, B. M. Sobolev, N. I. Tisengausen, L. N. Tunitskiy, P. S. Faysulov, determination of the moment of electron transition of oscillator forces and the widths of the Schuhmann-Runge bands of molecular oxygen; B. Ye. Gavrilov, A. V. Zharikov, V. I. Rayko, decomposition of the volume charge of intense ion beams; Ye. A. Kramer-Ageyev, V. S. Troshin, measurement of neutron spectra; G. G. Doroshenko, new methods of fast-neutron recording; V. I. Ivanov, dosimetry terminology; R. M. Voronkov,

Card 2/4

L 1931-66 EWT(m)/EPF(c)/ETC/EPF(n)-2/EWG(m)/EWP(b)
ACCESSION NR: AT6022583   UR/3136/64/000/592/0001/0020

AUTHOR: Gavrilov, B. Ye.; Zharinov, A. V.; Rayko, V. I.

TITLE: Dynamic decompensation of the space charge of ion beams in electromagnetic isotope separation

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-592, 1964. O dinamicheskoy dekompensatsii prostranstvennogo zaryada ionnykh puchkov pri elektromagnitnom razdelenii izotopov, 1-20

TOPIC TAGS: ion beam, plasma density, plasma oscillation, space charge, gas discharge plasma

ABSTRACT: An attempt is made at an elementary theoretical generalization of certain properties of intense ion beams, primarily for the purpose of finding possible methods of controlling dynamic decompensation. It is shown that the geometrical properties of beams extracted from plasma obey the laws of similarity. On the basis of these laws, general relationships are established which correlate the plasma density pulsations in the source, the angular divergence, the degree of dynamic decompensation, and the beam potential. The elementary theoretical analysis used shows that the regimes most favorable from the standpoint of dynamic decompensation of ion beams are those corresponding to divergent beams. Under these conditions, the degree of dynamic decompensation is minimal and is
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ACCESSION NR: AP5022583 O

the same in order of magnitude as the relative pulsation of plasma density in the discharge.
Therefore, since it is always possible to select regimes where the pulsations of angular
divergence become unimportant, a further increase in the intensity of compensated ion
beams will require the development of methods for substantially decreasing the level of
current density pulsations in the discharge. Orig. art. has: 8 figures, 19 formulas, and
1 table.

ASSOCIATION: None

SUBMITTED: 00   ENCL: 00   SUB CODE: ME, EM

NO REF SOV: 003   OTHER: 001

Card 2/2 $\searrow$

GAVRILOV, D.

Central warehouse of a department store in Belgium. Sov. torg.
no.4:54-57 Ap '57.   (MLRA 10:4)
          (Belgium--Warehouses)

SOV/84-58-11-39/58

AUTHORS: Zenin, S., Gavrilov, D.

TITLE: Pilot Tsyganov's Error (Oshibka pilota Tsyganova)

PERIODICAL: Grazhdanskaya aviatsiya, 1958, Nr 11, pp 30-32 (USSR)

ABSTRACT: The editors requested the authors to analyze the error
     committed by pilot Tsyganov (Urals aviation group) while flying
     under difficult weather conditions. The article describes the
     particular situation and attributes the pilot's accident to
     inexperience in instrument flying and generally inadequate train-
     ing, primarily responsible for his fatal decision to drop to a
     minimal altitude in search of a landing. The need for careful
     preliminary study of meteorological conditions is stressed and
     the importance of following the written instructions given all
     pilots which cover various situations and emergencies. The
     authors point to the difference between piloting transport planes
     and planes used for special purposes, the latter usually flown
     along local routes where guidance from the ground may not be

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Pilot Tsyganov's Error   SOV/84-58-11-39/58

depended upon. Personalities mentioned include pilot Lobutenkov
(Northern Territorial Administration), and An-2 commander
Smolyakov (Northern Caucasus Territorial Administration).

Card 2/2

CHERNYAK, N.I. [Cherniak, M.I.]; GAVRILOV, D.A. [Havrylov, D.O.];
    MANDEL', V.S.

Effect of metallurgical defects on the strength of 3Kh13 steel.
Prykl. mekh. 10 no.4:407-415 '64.   (MIRA 17:10)

1. Institut mekhaniki AN UkrSSR.

POKROVSKII, Aleksandr Nikolayevich; BUKIN, Aleksandr Alekseyevich; GAV-
RILOV, Dmitriy Fedorovich; TOLKACHEV, S.S., retsenzent; GONCHA-
RUK, Yu.K., red.; STRYZHKOVA, N.I., red. izd-va; NIKOLAYEVA,
L.N., tekhn. red.

[Operating motortrucks with carburetor engines under low temperature
conditions] Ekspluatatsiia avtomobilei s karbiuratornymi dvigatelemi
v usloviiakh nizkikh temperatur. Moskva, nauchno-tekhn. izd-vo M-va
avtomobil'nogo transp. i shosseinykh dorog RSFSR, 1961. 171 p.
                                                      (MIRA 14:10)

        (Motortrucks—Cold weather operation)

GAVRILOV, D. V.

USSR/Mining - Gas Analysis   Jul 50

"Portable Gas Interferometer," D. V. Gavrilov

"Zavod Lab" Vol XVI, No 7, pp 836-842

Describes portable apparatus for determination of
methane content in the air of mines. It may be
calibrated also for determining concentrations of
other gases, such as SO_2, H_2S, CO_2, hydrogen, gaso-
line, and others. Accuracy of measuring concen-
trations of these gases in the air depends on dif-
ference of refractive indexes of gases to be com-
pared and reaches 0.01% in some cases, e.g., in
determination of carbon bisulfide content.

166T89

GAVRILOV, D.V.

Computation of an ordinary lens with a single reflecting
surface. Opt. i spektr. 13 no.3:436-441 S '62. (MIRA 15:9)
(Lenses)

GAVRILOV, D. V.

USSR/Miscellaneous

Card   1/1   :   Pub. 104 - 10/14

Authors   :   Gavrilov, D. V., and Vil'chur, Ya. P.

Title   :   Rapid method of determining small differences in glass refraction indexes

Periodical   :   Stek. i ker. 10, 22-24, Oct 1954

Abstract   :   A new method for rapid determination of small differences in the index of refraction of optical glass is described. The method, developed by one of the authors (D. V. Gavrilov), is based on the disappearance of the visible boundaries of the glass submerged in a liquid at the moment the index of refraction becomes equalized. Tables; graph.

Institution :   ...

Submitted   :   ...

GAVRILOV, D.V.

Relationship between basic parameters of an infinitely thin component and its aberrations of the third order. Opt.-mekh.prom. 25 no.4:9-10 Ap '58.

(Optical instruments)   (MIRA 11:10)

ANANOVA, L.; GAVRILOV, E.

Patent purity of export production. Vnesh.torg. 43 no.4:49-51 '63.
            (Patents (International law))   (MIRA 16:4)

GAVRILOV, E.I.

Recent data on birds of western Kazakhstan.   Trudy Inst. zool.
AN Kazakh. SSR 15:46-49 '61.   (MIRA 14:7)
          (West Kazakhstan Province—Birds)

GAVRILOV, E.I.

Biology of the desert finch Rhodospiza obsoleta Licht. Trudy
Inst. zool. AN Kazakh. SSR 15:182-18? '51.   (MIRA 14:7)
(Nikolayevka region (Alma-Ata Province)—Finches)

GAVRILOV, E.I.; ZALESKIY, A.N.

Feeding of the falcons Falco tinnunculus L. and F. vespertinus L. in the forest-steppe part of the Central Black Earth Region. Zool. zhur. 40 no.6:882-887 Je '61.   (MIRA 14:6)

1. State University of Voronezh.
                (Gremyach'ye District—Falcons)
                    (Birds—Food)

FEDOSENKO, A.K.; GAVRILOV, E.I.

    Effect of the peculiarities of spring on the behavior of birds.
    Biul. MOIP. Otd. biol. 67 no.1:121-122 Ja-F '62.   (MIRA 15:3)
                 (BIRDS—BEHAVIOR)

GOLOVANOVA, E.N., kand.biolog.nauk; ZUSMANOVICH, T.G.; GAVRILOV, E.I.

Poisoned grain baits against sparrows. Zashch. rast. ot vred.
i bol. 6 no.3:34-35 Mr '61.   (MIRA 15:6)

1. Kazakhskiy institut zashchity rasteniy, Alma-Ata (for Gavrilov).
      (Soviet Central Asia--Sparrows--Extermination)

GAVRILOV, E.I.

Extermination of sparrows with poisoned baits in Kazakhstan.
Ornitologiia no.5:314-319 '62.   (MIRA 16:2)
                (Kazakhstan—Sparrows—Extermination)

GAVRILOV, E.I., kand. biolog; nauk; SHUTKIN, P.A.

Is the "sparrow" problem definitely   solved? Zashch. rast. ot vred.
i bol. 9 no.9:7-8 '64.
(MIRA 17:11)

1. Kazakhskiy Institut zashchity rasteniy i Dzhambulskaya stantsiya
zashchity rasteniy.

PODBOLOTOV, A. (Kolomna); GAVRILOV, F. (Kolomna)

The workers' collective in the role of educator. Mest.prom. i
khud.promys. 2 no.12:4 D '61.   (MIRA 14:12)
          (Communist Party of the Soviet Union—Party work)

CA

3

Thermal quenching of photoluminescence of zinc oxide.
F. I. Vergunas and F. F. Gavrilov (Tomsk State Univ.).
Doklady Akad. Nauk S.S.S.R. **57**, 31–4(1947); cf. C.A.
42, 6243i. –ZnO with green photoluminescence, in which the
content of free Zn was varied by heating in air to 680–730°,
was examined. The curve of intensity of luminescence against
temp. is S-shaped with a rapid decline between 230 and
110°K. As intensity of exciting light is reduced, the magni-
tude of U (activation energy) remains const., but C (the
ratio of ionic vibration frequency to the probability of emis-
sion) increases. ZnO heated in air displays increase of C
with reduction of the content of free Zn atoms, but U re-
mains const. Hence the electron transfer occurs from the
Zn atom level to the cond. zone, which leads to quenching of
luminescence of ZnO.   G. M. Kosolapoff

GAVRILOV, F. F.

Vergunas, F. I. and Gavrilov, F. F. "The relative amount of the
spontaneous afterglow of zinc oxide," Trudy Sib. fiz.- tekhn. in-ta, Issue 26,
1948, p. 140-45, - Bibliog: 6 items

SO: U-5241, 17 December 1953, (Letopis'Zhurnal 'nykh Statey, No. 26, 1949)

GAVRILOV, F. F.

Vergunas, F. I. and Gavrilov, F. F. "Infrared luminescence of zinc oxide,"
Trudy Sib. Fiz.-tekhn. in-ta, Issue, 1946, p. 146-48

SO: U-5241, 17 December 1953, (Letopis 'Zhurnal 'nykh Statey, No. 26, 1949)

GAVRILOV, F. F.

Vergunas, F. I. and Gavrilov, F. F.   "The action of the blue band
of Zn in phosphorous ZnSmN with variable Mn concentration,"
Trudy Sib. fiz,-tekhn. in-ta, issue 26, 1949, p. 149-54

SO: U-5241, 17 December 1953, (Letopis 'Zhurnal 'nykh Statey, No.26, 1949)

Luminescence spectra of zinc oxide. F. I. Vergunas and F. F. Gavrilov (Siberian Phys. Tech. Inst., Tomsk Univ.). *J. Exptl. Theoret. Phys.* (U.S.S.R.) 18, 224-7 (1948)(in Russian).—Both at room temp. and at −180°, ZnO shows the same luminescence spectrum, with one single max. at 480 mμ, whether untreated or previously heated to 50° and 600°. Previous heating to 630° gives rise to 2 new bands with max. at about 525 and 560 mμ; after heating to 730°, a 4th band with max. at 670 mμ appears. The addnl. bands are marked at −180° but are of negligible intensity, as compared with 480 mμ, at room temp. For ZnO heated at 730°, visual brightness at room temp. is max at 525 mμ, at −180°, at 560 mμ. Such samples luminesce with a golden-yellow color at the temp. of liquid air, lettuce-green at room temp. The authors' (*Doklady* 57, 31(1947)) formula for the temp. extinction of the intensity of luminescence $I = I_0/(1 + Ce^{-C/kT})$, where C = coeff., U = distance between the levels of Zn atoms and the cond. zone, will apply to the extinction of this sample, if the U value characteristic of the 560 mμ band is used at low temp., and that corresponding to 525 mμ, at room temp. From the temp. dependence of the 4 bands of ZnO, the 4 values of U are 0.36, 0.5, 0.6, and 0.8 v. Elec. cond. (in the dark) of ZnO subjected to various thermal treatments, gives (V., *Trudy Sibirskogo Fiz.-Tekh. Inst.* 24, 184(1947)) 5 levels, U = 0.4, 0.5, 0.6, 0.8, and 1.0. If every local level gives rise to a luminescence band, ZnO should have a 5th band at about 770 mμ; which, however, has not yet been observed. Emission and absorption spectra give the 4 values of U give 0.6, 0.8, 1.0, and 1.2, that is higher than those derived from both the temp. extinction of luminescence and from the dark cond.   N. Thon

3

Dependence of the intensity of luminescence of zinc oxide and zinc sulfide on the intensity of the excitation. F. I. Vergunas and F. F. Gavrilov. *Zhur. Eksptl. Teoret. Fiz.* (*J. Exptl. Theoret. Phys.*) 18, 873-7(1948); cf. *C.A.* 42, 7161e.—Temp. quenching of the intensity I of luminescence of ZnO is represented very accurately by $I = I_0/(1 + Ce^{-U/kT})$, with the activation energy for nonradiative transition, $U = 0.18$ e.v.; I_0 is the min. intensity at low temps. where the exponential term is negligible, and the coeff. C is a function of the intensity of excitation E. Weakening of E by a factor 1/11.4 resulted in 1.69 fold increase of C. If the change of C with E is represented by $C_i = CE_i^{-\epsilon}$, where the subscript i refers to the weakened excitation, one has, for ZnO, $\epsilon = 0.25$, and the law of variation of I_i is $I_i = E_i(1 + Ce^{-U/kT})[1 + (C/E_i^\epsilon)e^{-U/kT}]^{-1}$. It permits calcn. of the $I(E)$ curve for any given temp., and is confirmed for ZnO at -180 and at $+25°$, the exptl. point lying exactly on the lines log I(log E); at high E, the lines converge and practically merge. At $-180°$, the line is straight, at $+25°$ it deviates from linearity, becoming slightly concave to the axis of abscissas. Luminescence of ZnS.Zn (pure ZnS), filtered so as to transmit 440–490 mμ and to absorb the emission due to the Cu impurity (2% of the total emission), follows the same law, with $U = 0.47$ e.v., $\epsilon = 0.5$. Plots of log I against log E, showing complete agreement of the exptl. points with the calcd. curves, are rectilinear at $-53°$ but deviate from linearity at +21 and 44° owing to temp. quenching.

N. Thon

METALLURGICAL LITERATURE CLASSIFICATION

Dependence of the relative quantum efficiency of the luminescence of zinc oxide on the exciting wave length. F. I. Vergunas and F. F. Gavrilov (Siberian Phys. Tech. Inst. at Tomsk State Univ.). *Doklady .Akad. Nauk S.S.S.R.* **69**, 1273–5(1948); cf. *C.A.* **42**, 6343i. Spectral distribution of the luminescence of ZnO was found independent of the wave length λ of the exciting radiation, at λ 365, 312, and 254 mμ; in all 3 cases, luminescence had a max. at about 500 mμ. The relative quantum efficiency $\varphi = y \times (\lambda_e/\lambda_a)$ ($y = E_e/E_a$, E = energy, subscripts e and a referring, resp., to emitted and absorbed light) detd. on ZnO powder in a layer 3×10^{-3} g./sq. cm. thick, proved to be const. (~ 0.27) and independent of λ_e between 355 and 254 mμ. At these 2 wave lengths, the relation between ln I (intensity of luminescence) and ln E (intensity of exciting radiation) is linear and the 2 lines are of equal slope, i.e. the constancy of φ holds even when E is decreased $^1/_{10}$; only on further decreasing E does I decrease faster than linearly.

N. Thon

Effect of the temperature of heating and of the concentration of the activator on the law of the temperature quenching of the luminescence of phosphors. F. I. Vergunas and F. F. Gavrilov (Tomsk State Univ.). Zhur. Eksptl. Teoret. Fiz. 20, 221-32(1950). — Curves of the intensity I of the green (Cu) luminescence band of ZnS·Cu phosphors with Cu contents varying between 10^{-1} and 10^{-1} g./g., heat-treated under identical conditions, show constancy in an intermediate temp. range (satn. luminescence), and falling off both at higher and at lower temps.; the low-temp. drop was not directly observed with the highest Cu contents of 10^{-1} and 10^{-1}, but may possibly exist at temps. below the range of observation. The satn. portion of the curve and the high-temp. drop fit the formula $I = I_0/(1 + Ce^{-U/kT})$, where I_0 = satn. intensity, U = activation energy of quenching. From the exptl. data, with Cu = 10^{-1}, 10^{-1}, 10^{-1}, 10^{-1}, and 10^{-1} g./g., $U = 1, 1, 1, 1, 0.6$, and 0.6, $10^{-4}C = 5.9, 3.6, 1.97, 0.76, 0.11$, and 0.04. Up to the optimum concn. N of the activator, U is const., but decreases beyond the optimum N. The coeff. C decreases with increasing N according to $C = C_0N^{-1}$, i.e. temp. quenching begins the earlier, the lower N. At const. N, but with increasing temp. of heating in the

prepn. of the phosphor, both U and C increase, e.g., for phosphors heated to 700, 900, 1000, 1100, and 1200°, $U = 0.45, 0.50, 0.57, 0.67$, and 0.72 e.v., $10^{-4}C = 5.75, 6.0, 10.9, 118$, and 110. With phosphors heated to lower temp., quenching starts earlier. The dependence of I on the intensity of excitation E can be described by assuming inverse proportionality between C and $\sqrt{E}$, which gives $I = E(1 + Ce^{-U/kT})/(1 + C_0E^{-1/2}e^{-U/kT})$, confirmed by exptl. data. The efficiency of luminescence is independent of E (varied by a factor of 100) at room temp., i.e. in the temp. range of satn. luminescence (except for a fall at very low E), but decreases with E, proportionally to $\sqrt{E}$, in the range of temp. quenching (e.g. at 340 K.). For the blue (Zn) band of ZnS·Cu, with Cu = 10^{-1}, 10^{-1}, and 10^{-1} g./g., $U = 0.13, 0.18$, and 0.17 e.v., $10^{-4}C = 4.6, 3.32$, and 0.73, resp. Consequently, presence of Cu renders the blue band less temp.-resistant.

N. Thon

AUTHOR   STRIGANOV A.R., GAVRILOV F.F., YEFREMOV S.P.   PA - 2721

.TITLE   A Method for the Qualitative Spectral Analysis of Isotope Compositions of Enriched Uranium. (Metod spetral'nogo kolic hestvennogo analiza izotopnogo soatva obogashchennogo urana.- Russian.)

PERIODICAL   Atomnaia Energiia 1957, Vol 2, Nr 4, pp 337 - 344 (USSR). Received: 5/1957   Reviewed: 6/1957

ABSTRACT   The authors developed a photographic method for the spectral analysis of the isotope composition of enriched uranium at concentrations of from 2 to 90 % U^{235} and higher. The possibilities of this method and its advantage compared with other methods are shown here by the example of uranium. Besides, the present work carries out an experimental examination of the calibration curves used for the analysis of the isotopes of heavy elements.

Experiment: The glass three-prism spectrograph ISP-51 with the autocollimation chamber UF-85 (F - 1300 mm) served as spectros- cope. An alternating current arc served as a light source. Liquid samples in form of an aqueous solution of nitric acid uranium salt was best suited. Solutions of the salts of natural as well as of enriched uranium were used for the composition of the two-isotope standars $U^{235} + U^{238}$.

CARD 1/2

A Method for the Qualitative Spectral Analysis of Isotope
Compositions of Enriched Uranium.

Selection of the spectral line: For the isotope analysis of
uranium the line 4244,374 $\overset{o}{A}$ of the uranium is best suited
because it belongs to the group of the most sensitive lines
and has a high isotope shift. Besides, this line is located
in a domain that is free from cyanogen bands. A photograph
shows the well separated components of this line corresponding
to the isotopes
U^{235} and U^{238} . The scheme of transitions and the isotope
structure of this line are shown in form of a diagram.
A formula is given and discussed for the calibration curves.
Microphotographs of the spectra of three uranium samples
enriched with 2,82, 9,52 and 50% are added. The results found
here determine sufficiently well the general deliberations
concerning the course of the calibration curves in the case
of the existence of a background and the reciprocal location
of the isotope lines.
In conclusion, carrying out of the analysis and the accuracy
of the method are discussed. This method is at least as
accurate and essentially quicker than the other methods. Total
analysis of a sample does not take longer than 1 hour.
(8 illustrations and 2 tables.)

CARD 2/2

ASSOCIATION: not given.
PRESENTED BY: -
SUBMITTED: 20.7. 1956.
AVAILABLE: Library of Congress.

AUTHOR: Gavrilov, F.F.

TITLE: A Method of Spectral Isotopic Analysis of Lithium

SOV/51-7-3-1/21

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 3, pp 285-288 (USSR)

ABSTRACT: The author describes a spectral method, developed in 1953-5, of
            isotopic analysis of lithium. The Li I line at 6707.86 Å was used for
            this purpose under conditions which ensure the absence of re-absorption.
            The method does not require the use of standard samples with known
            isotopic composition. The isotopic structure was resolved by means of
            a Fabry-Perot etalon crossed with a diffraction spectrograph DS-1
            (slit width 0.1 mm). A water-cooled hollow-cathode gas-discharge
            tube (Fig 1) was used as the light source. The discharge occurred in
            a current of helium at 2 mm Hg pressure, with 300 mA passing through
            the tube. A thin layer of lithium was deposited electrolytically on the
            polished end of a rod which served as the bottom of the hollow cathode.
            Best results were obtained with samples of 3×10^{-6}g weight: re-absorption
            of light is then very small. Spectra were recorded on a panchromatic film
            (exposure time was 10 min). The isotopic structure of the 6707.86 Å line
            is shown in Fig 2. Theory prodicts that the ratios of the intensities

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A Method of Spectral Isotopic Analysis of Lithium   SOV/51-7-3-1/21

of the doublet lines are $I_a/I_b = I_c/I_d = 2$ (the subscripts "a" and "b" refer to the Li^7 isotope, and the subscripts "c" and "d" refer to Li^6). The concentrations of the lithium isotopes can be determined by comparing the intensities of the components a and d (variant I), components a and b + c (variant II) or the components b + c and d (variant III). Each of those variants is useful in a certain range of lithium isotope concentrations. To carry out measurements in a wider range of concentrations a variant IV can be used. In this variant the etalon thickness is 0.721 cm, which ensures coincidence of the components d and a and consequently the line structure will be in the form of equidistant lines (lower part of Fig 3). Fig 4 is a spectrogram of a sample with natural relative abundance of the lithium isotopes; it was obtained with the etalon separation of 0.706 cm. The systematic error which was due to incomplete coincidence of the line structure components at this etalon thickness was allowed for separately. To minimize the errors in the analysis due to inexact value of the contrast factor γ of the photographic film, the author used a special two-section multi-step attenuator. This attenuator was placed at the spectrograph slit, with its steps parallel to the interference bands. The author describes how to use this attenuator to find the value of γ. To check the method and find its precision the

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author analysed many times lithium samples with the naturally occurring proportions of isotopes. The results obtained for 25 samples are given in a table on p 288. The mean value of the Li^6 concentration in 25 samples was $7.6 \pm 0.2\%$. The relative abundance Li^7/Li^6 is, therefore, 12.2 ± 0.3. The Li^6 concentration quoted above agrees, within the experimental error, with the results of mass-spectrometric studies. The spectral method described here was used also to analyse other samples of lithium with Li^6 concentrations of 33.3, 35.1, 59.0, 66.7 and 89.6%. The experimental error in all these spectral determinations did not exceed 0.2%. Additional tests showed that the presence of impurities in proportions of up to several per cent did not affect the results obtained. Acknowledgments are made to A.R. Striganov and V.I. Malyshev for their advice and to Yu.P. Nazarov and M.I. Fedorovskaya for their help in experimental work. There are 5 figures, 1 table and 6 references, 1 of which is Soviet, 1 English, 1 Dutch and 3 mixed (English, German and international).

SUBMITTED: December 4, 1958
Card 3/3